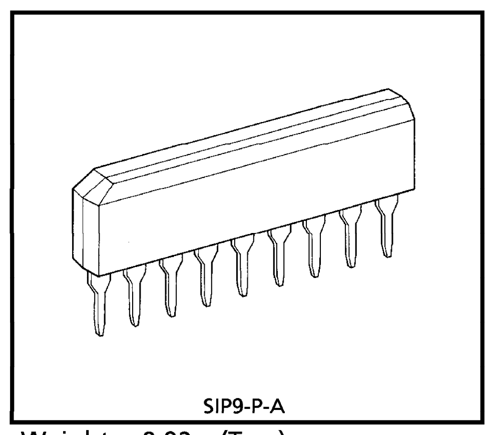
TOSHIBA BIPOLAR LINAR INTEGRATED CIRCUIT

TA7343AP

SILICON MONOLITHIC

FM PLL MPX

The TA7343AP is PLL FM stereo multiplex IC.
It is suitable for automotive applications and portable radio applications because of space merit by the package and wide supply voltage range.

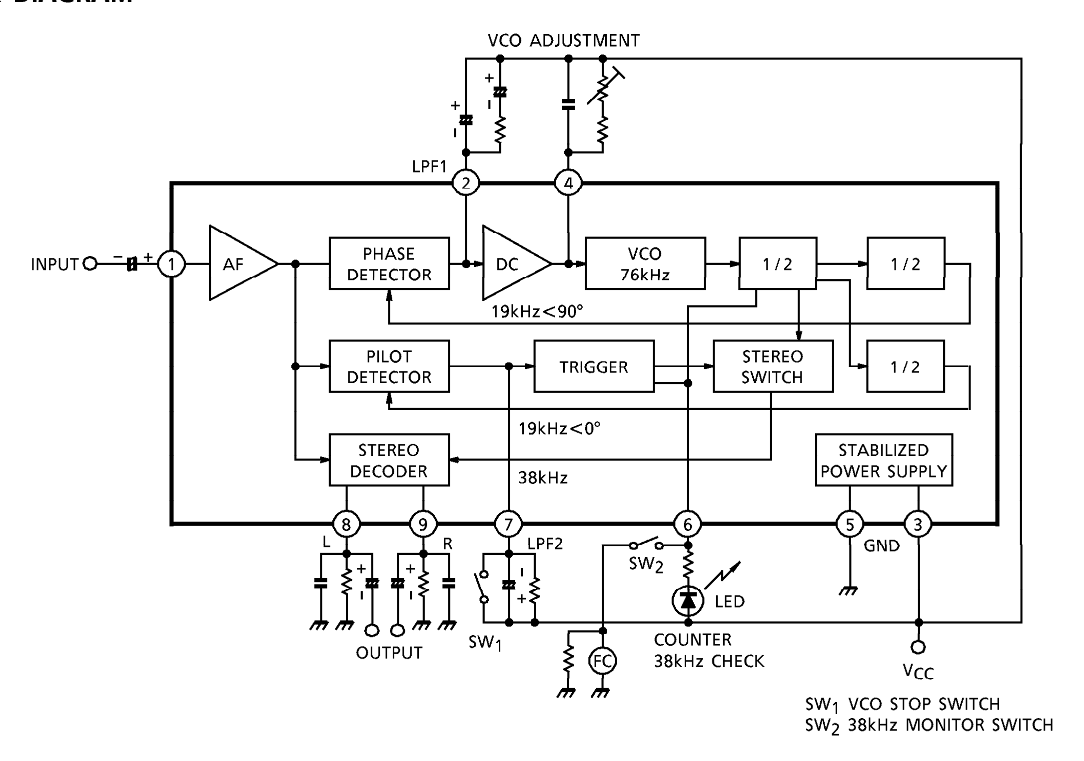

SIP9-P-A

Weight : 0.92g (Typ.)

FEATURES

- Excellent stereo LED sensitivity
  : $V_{L(ON)} = 9mV_{rms}$ (Typ.)
- Suitable for LED driving : $I_{LED} = 20mA$ (Max.)
- Recommendable input voltage range
  : $V_{in} = 200\sim700mV_{rms}$
- Operating supply voltage range : $V_{CC} = 3.5\sim12V$
- Excellent channel separation through entire audio frequency range : Sep = 45dB (Typ.)
- Low distortion : THD = 0.08% (Typ.) at $V_{in} = 200mV_{rms}$ (Stereo)
- Built-in compulsive monaural function. (The VCO is stopped when the pin⑦ is connected with the power supply line, and then the stereo indicator is turn off.)
- Easy adjustment (The monitored free running frequency of VCO is 38kHz at pin⑥.)

BLOCK DIAGRAM



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	12	V
LED Voltage	V_{LED}	16	V
LED Current	I_{LED}	20	mA
Power Dissipation	P_D (Note)	500	mW
Operating Temperature	T_{opr}	−30~75	°C
Storage Temperature	T_{stg}	−55~155	°C

(Note) Derated above Ta = 25°C in the proportion of 4mW / °C.

ELECTRICAL CHARACTERISTICS

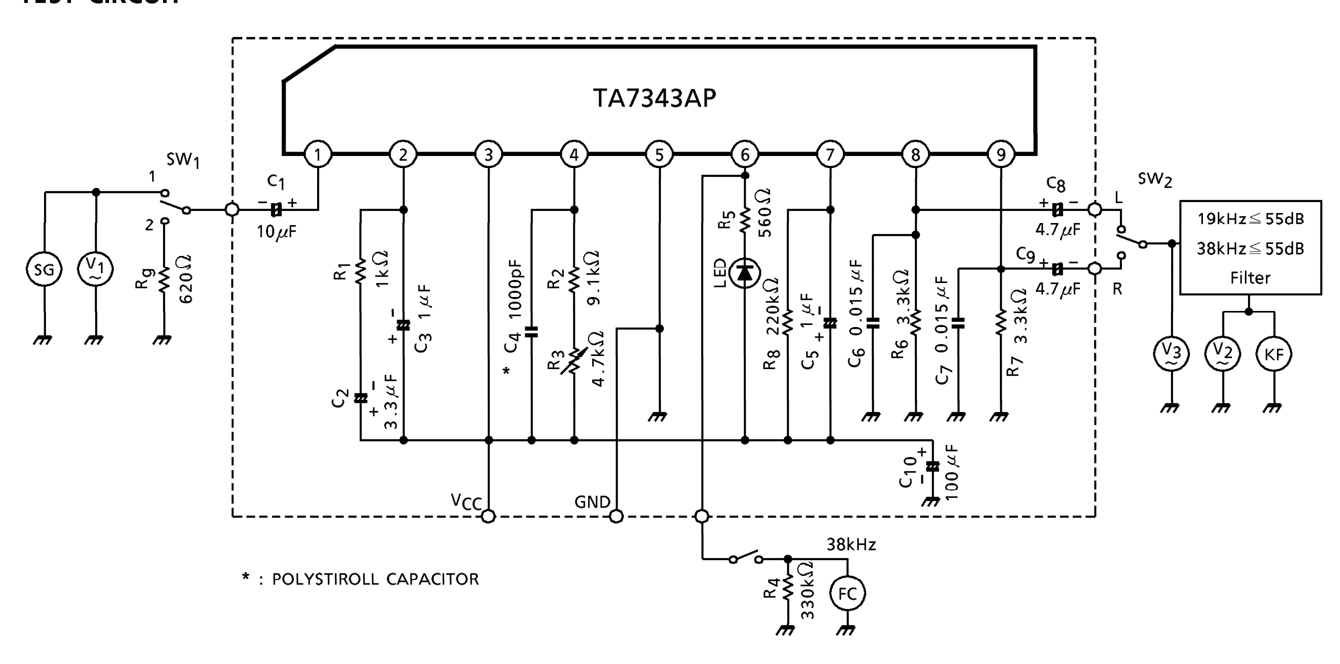
1. DC characteristics (Ta = 25°C, V_{CC} = 8V, terminal voltage at no signal)

PIN No.	CHARACTERISTIC	SYMBOL	TYP.	UNIT
Pin①	INPUT	V1	3.5	V
Pin②	LPF 1	V2	6.6	V
Pin③	V_{CC}	V3	8.0	V
Pin④	VCO	V4	7.1	V
Pin⑤	GND	V5	0	V
Pin⑥	ST LED	V6	—	V
Pin⑦	LPF 2	V7	7.4	V
Pin⑧	L-ch OUTPUT	V8	4.0	V
Pin⑨	R-ch OUTPUT	V9	4.0	V

2. AC characteristics (Unless otherwise specified, Ta = 25°C, V_{CC} = 8V, f = 1kHz)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC}	—	at LED off		—	11	18	mA
Input Resistance		R_{IN}	—			—	33	—	kΩ
Max. Composite Signal Input Voltage		V_{in} MAX (STEREO)	—	L + R = 90%, P = 10% THD = 1%		—	900	—	mV_{rms}
Separation		Sep	—	L + R = 180mV_{rms} P = 20mV_{rms}		36	45	—	dB
Total Harmonic Distortion	Monaural	THD (MONAU-RAL)	—	V_{in} = 200mV_{rms}		—	0.08	0.3	%
	Stereo	THD (STEREO)	—	L + R = 180mV_{rms} P = 20mV_{rms}		—	0.08	—	
Voltage Gain		G_V	—	V_{in} = 200mV_{rms}		− 2.0	0	2.0	dB
Channel Balance		CB	—	V_{in} = 200mV_{rms}		—	0	1.5	dB
Stereo LED Sensitivity	ON	V_L (ON)	—	Pilot Input		—	9	15	mV_{rms}
	OFF	V_L (OFF)	—			2	6	—	
Stereo LED Hysteresis		V_H	—	to turn off from LED turn on		—	3	—	mV_{rms}
Capture Range		CR	—	P = 20mV_{rms}		—	± 3	—	%
Carrier Leak	19kHz	CL	—	P = 20mV_{rms} L + R = 180mV_{rms}		—	34	—	dB
	38kHz					—	42	—	
SCA Rejection Ratio		SCA Rej	—	P = 20mV_{rms} L + R = 160mV_{rms} SCA = 20mV_{rms} f_{SCA} = 67kHz		—	70	—	dB
Signal to Noise Ratio		S / N	—	V_{in} = 200mV_{rms} f = 1kHz, R_g = 620Ω		—	74	—	dB
Output Current (Pin⑧, Pin⑨)		I_{OUT}	—	R_L = 3.3kΩ	V_{CC} = 3.5V	—	0.3	0.6	mA
					V_{CC} = 8.0V	—	1.2	1.8	
					V_{CC} = 12V	—	1.4	2.1	

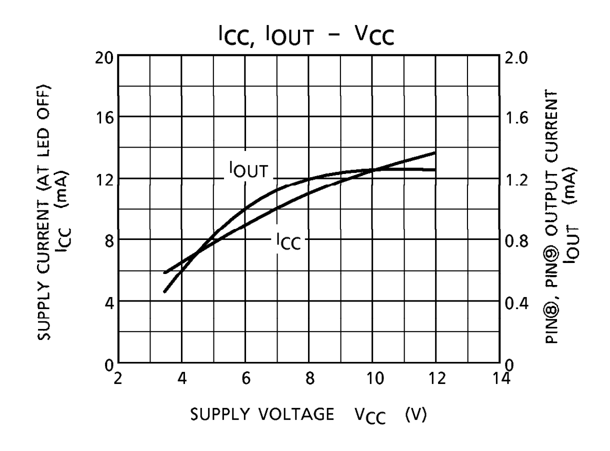
TEST CIRCUIT

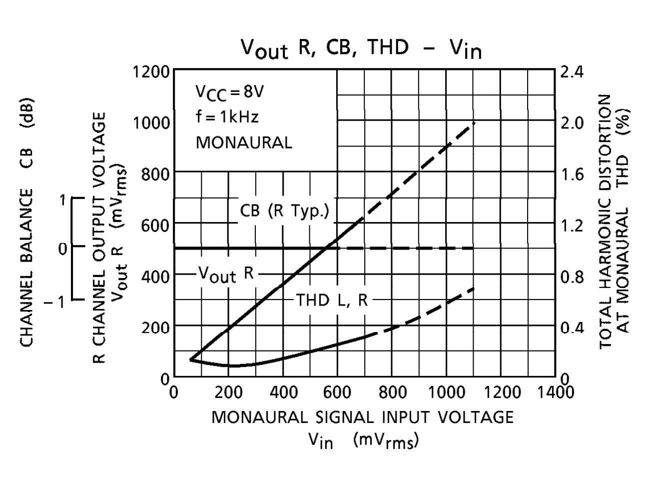


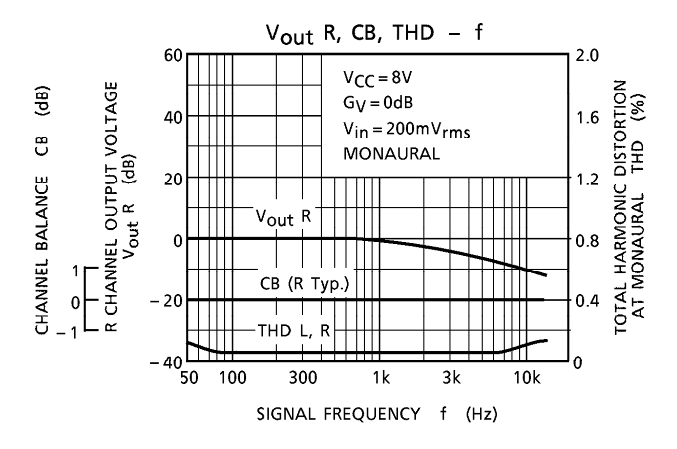
SG : STEREO SIGNAL GENERATOR
FC : FREQUENCY COUNTER
V_1, V_2, V_3 : AC VOLTMETER
KF : DISTORTION METER

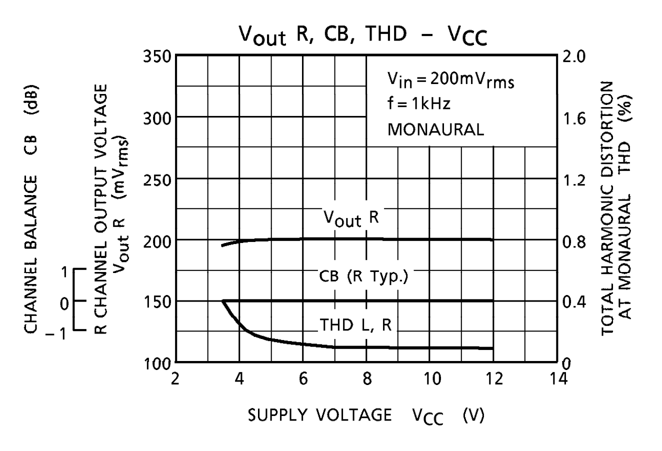
EXTERNAL PARTS TABLE

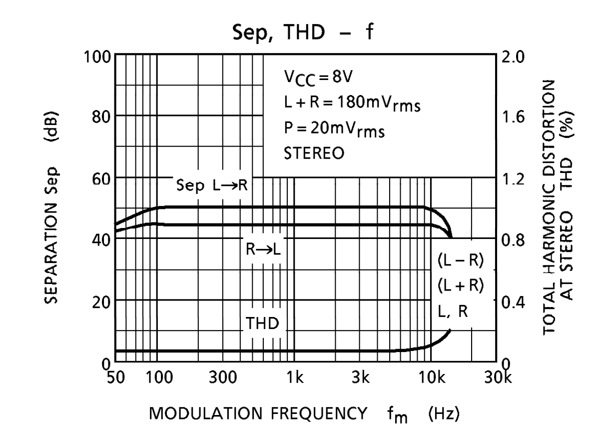
PARTS No.	TYPICAL	PURPOSE	INFLUENCE		NOTE
			SMALLER THAN TYP.	GREATER THAN TYP.	
C_1	10μF	Coupling	Separation is bad at 50~300Hz	"POP" noise is high	Input
C_2	3.3μF	LPF at PLL	THD is bad at 5~10kHz (stereo)	Narrow capture range	—
C_3	1μF				
R_1	1kΩ				
C_4	1000pF	VCO Free Running Frequency adjustment	C_4 : Small→Wide capture range and large glitter C_4 : Large→Narrow capture range		—
R_2	9.1kΩ				
R_3	4.7kΩVR				
R_4	330kΩ	Monitor Load	—		—
R_5	560Ω	Rush Current Limiter	IC is damaged by the rush current	LED is dark	$I_{LED} \leqq 20mA$
LED	—	Stereo Indicator	Usable for LED		
C_6	0.015μF	Load and Diemphasis	Diemphasis (50μs)		$C_6 = 0.022μF$ for 75μs
R_6	3.3kΩ		Output voltage is small	THD is bad for low V_{CC}	
C_7	0.015μF	Load and Diemphasis	Diemphasis (50μs)		$C_7 = 0.022μF$ for 75μs
R_7	3.3kΩ		Output voltage is small	THD is bad for low V_{CC}	
C_8	4.7μF	Output Coupling	Frequency response is bad	"POP" noise is large	L-ch
C_9	4.7μF	Output Coupling			R-ch
R_8	220kΩ	LED Sensitivity Adjustment	$V_{L(ON)}$ is large	$V_{L(ON)}$ is small	—
C_5	1μF	LPF at LED	THD is bad at 50~300Hz	Slow LED response	—

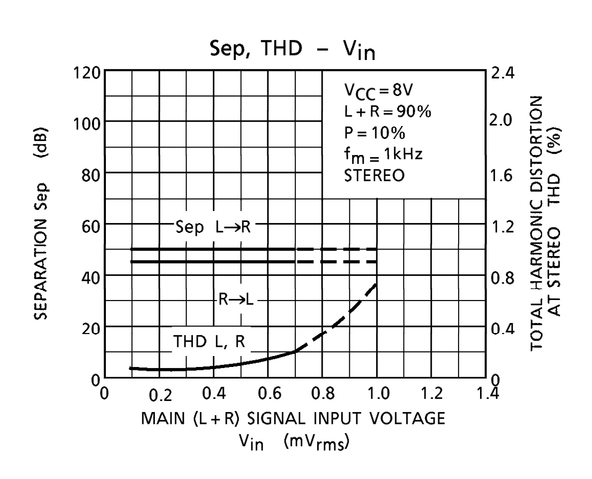

ICC, IOUT – VCC
SUPPLY CURRENT (AT LED OFF) ICC (mA)
PIN⑧, PIN⑨ OUTPUT CURRENT IOUT (mA)
IOUT
ICC
SUPPLY VOLTAGE VCC (V)


Vout R, CB, THD – Vin
VCC = 8V
f = 1kHz
MONAURAL
CB (R Typ.)
Vout R
THD L, R
CHANNEL BALANCE CB (dB)
R CHANNEL OUTPUT VOLTAGE Vout R (mVrms)
TOTAL HARMONIC DISTORTION AT MONAURAL THD (%)
MONAURAL SIGNAL INPUT VOLTAGE Vin (mVrms)


Vout R, CB, THD – f
VCC = 8V
GV = 0dB
Vin = 200mVrms
MONAURAL
Vout R
CB (R Typ.)
THD L, R
CHANNEL BALANCE CB (dB)
R CHANNEL OUTPUT VOLTAGE Vout R (dB)
TOTAL HARMONIC DISTORTION AT MONAURAL THD (%)
SIGNAL FREQUENCY f (Hz)


Vout R, CB, THD – VCC
Vin = 200mVrms
f = 1kHz
MONAURAL
Vout R
CB (R Typ.)
THD L, R
CHANNEL BALANCE CB (dB)
R CHANNEL OUTPUT VOLTAGE Vout R (mVrms)
TOTAL HARMONIC DISTORTION AT MONAURAL THD (%)
SUPPLY VOLTAGE VCC (V)


Sep, THD – f
VCC = 8V
L + R = 180mVrms
P = 20mVrms
STEREO
Sep L→R
R→L
THD
(L – R)
(L + R)
L, R
SEPARATION Sep (dB)
TOTAL HARMONIC DISTORTION AT STEREO THD (%)
MODULATION FREQUENCY fm (Hz)


Sep, THD – Vin
VCC = 8V
L + R = 90%
P = 10%
fm = 1kHz
STEREO
Sep L→R
R→L
THD L, R
SEPARATION Sep (dB)
TOTAL HARMONIC DISTORTION AT STEREO THD (%)
MAIN (L + R) SIGNAL INPUT VOLTAGE Vin (mVrms)

Sep, THD – V_{CC}

$L+R=180mV_{rms}$
$P=20mV_{rms}$
$f_m=1kHz$
STEREO

Sep L→R
R→L
THD L, R

SEPARATION Sep (dB)
TOTAL HARMONIC DISTORTION AT STEREO THD (%)
SUPPLY VOLTAGE V_{CC} (V)

V_L, f_{VCO} – V_{CC}

$V_{L\ (ON)}$
f_{VCO}
$V_{L\ (OFF)}$

PILOT SIGNAL INPUT VOLTAGE V_L (mV_{rms})
FREE RUNNING FREQUENCY f_{VCO} (kHz)
SUPPLY VOLTAGE V_{CC} (V)

Sep, THD – f_{VCO}

$V_{CC}=8V$, $L+R=180mV_{rms}$
$P=20mV_{rms}$, $f_m=1kHz$
STEREO

Sep L→R
R→L
THD L, R

SEPARATION Sep (dB)
TOTAL HARMONIC DISTORTION AT STEREO THD (%)
FREE RUNNING FREQUENCY f_{VCO} (kHz)

Sep, – f_{VCO}

$L+R=180mV_{rms}$
$P=20mV_{rms}$, $f_m=1kHz$
STEREO

8
$V_{CC}=12V$
4

SEPARATION Sep (dB)
FREE RUNNING FREQUENCY f_{VCO} (kHz)

CAPTURE RANGE & LOCK RANGE CR & LR

$V_{CC}=8V$
$C_4=1000pF$
$R_2=9.1k\Omega$
$R_3=4.7k\Omega VR$

CR
LR

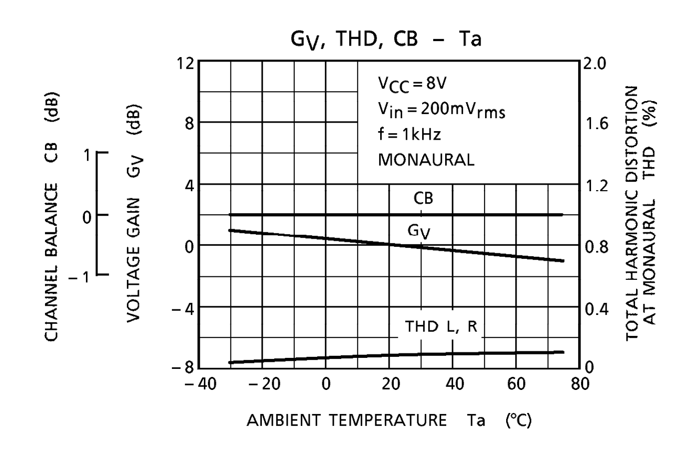
PILOT SIGNAL INPUT VOLTAGE $V_{in(P)}$ (mV_{rms})
FREE RUNNING FREQUENCY f_{VCO} (kHz)

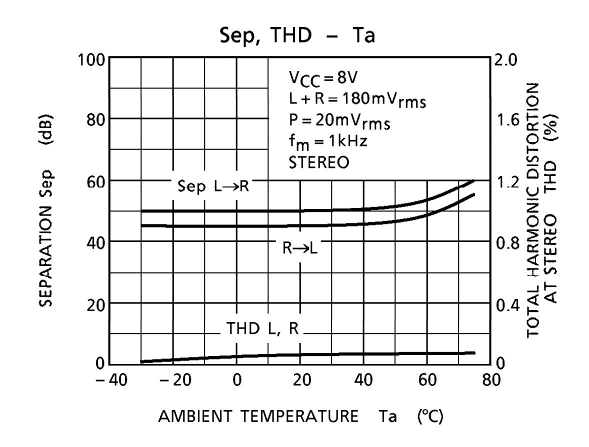
V_L – Ta

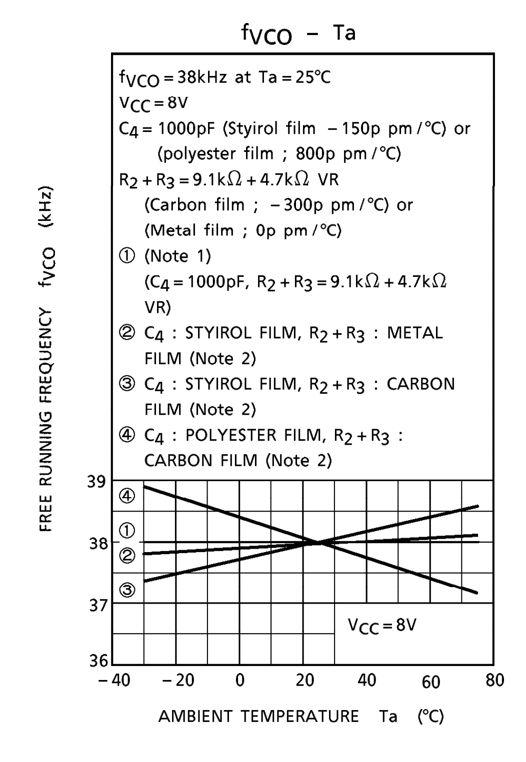
$V_{CC}=8V$

$V_{L\ (ON)}$
$V_{L\ (OFF)}$

PILOT SIGNAL INPUT LEVEL V_{in} (mV_{rms})
AMBIENT TEMPERATURE Ta (°C)



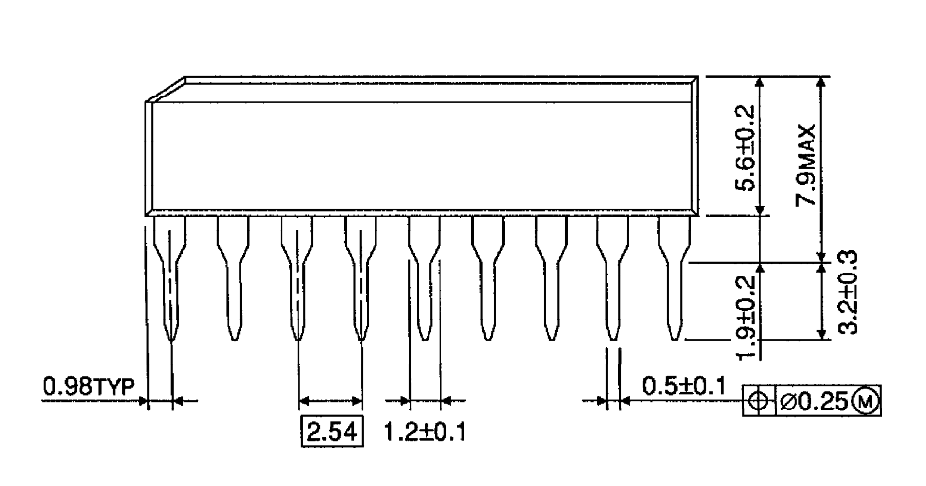


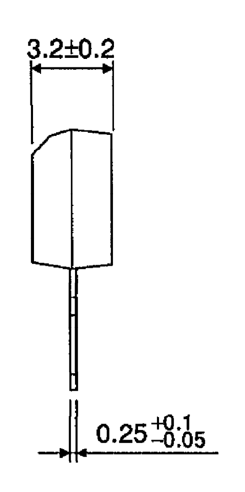


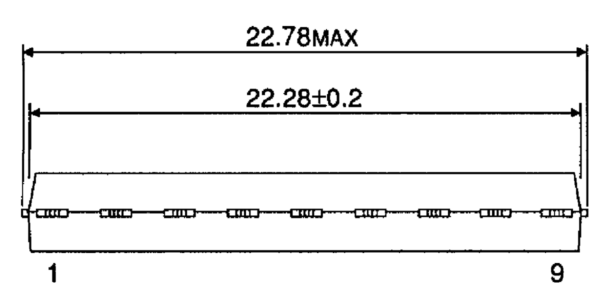
(Note 1) ① : With IC only put into a temperature test chamber
(Note 2) ②③④ : With IC, resistors and capacitors put into a temperature test chamber

OUTLINE DRAWING
SIP9-P-A

Unit : mm







Weight : 0.92g (Typ.)